Amendments to the Specification

Please replace paragraphs [0178, 0185, 0194, 200, 207, 211, 228] and [0192, 0194] with the following amended paragraphs:

[0178] Nucleic acids may be labeled using any fluorescent label and method known to one skilled in the art. In one embodiment, the nucleic acids are labeled with ~~Cy3(tm)~~ CY™3, an orange fluorescing cyanine label. A set of nucleic acid oligomers are designed, wherein the internal sequence is a random sequence and the N- and C-terminal ends have an essentially same sequence or an anchor sequence. An example of a random oligo nucleotide with random 20-mer sequence in between is T(15)CCN(20) AAACATTGCGAAGAAA (SEQ ID NO: 6). Such random primers with fixed anchor ends can then be used to create a library by amplifying nucleic acids isolated from any source, such as bacterial DNA. Once the random sequences are amplified, they can be cloned into a library, for example a plasmid library, using methods known to one skilled in the art. Such libraries can then be amplified using, for example, PCR with a forward primer haveing a sequence T(15)CC in combination with a ~~Cy3(tm)~~ CY™3 labeled reverse primer T*TTGTAACGCTTCTTT (SEQ ID NO: 7).

[0185]Examples of cations useful according to the methods of the present invention in testing the optimal conditions for nucleic acid-fluorophores for their responses to vapor phase analytes include, but are not limited to: Ag - based on papers that suggest silver increases ~~Cy3(tm)~~ CY™3 fluorescence in microarray; Re - based on paper that Rhenium causes superconducting-like resistance in DNA; transition metals, also want to test different oxidation states of the transition metals (Cr, Co, and Zn already tested); Alkali metals, LI, Rb, and Fr (Na, K, and Cs already tested); Alkaline Earth Metals, Be (Mg, Ca, Sr, Ba already tested); Lanthanide and Actinide

Series, use those which are not poisonous or radioactive, (U02 already used); Groups 3a - 6a: use those which have ionic forms soluble in water (Al already used)

[0192] Single-stranded DNA sequences can show differential analyte responses. As a further test of whether differences in DNA sequence can produce sensors with different response profiles, sensors made from single-stranded DNA stained with the fluorescent dye ~~OliGreen~~ OLIGREEN (Molecular Probes, Inc.), an unsymmetrical cyanine dye were tested. A sensor made from the ~~OliGreen~~ OLIGREEN dye alone showed a decrease in fluorescence upon exposure to propionic acid, but little change with other analytes (not shown). This response was not eliminated with longer rinse times of 10 and 15 min. Sensors made from Oligo dT and oligomer DS003 showed enhanced signals to propionic acid and the other analytes tested (DS003 shown in Fig. 3A). The response profiles of these two sensors were similar to each other, and were also similar to the responses of the double-stranded DNA sensors made with YO-PRO (Fig. 2B).

[0194] With applied dyes such as ~~OliGreen~~ OLIGREEN®, there is little control over how the dye interacts with the DNA sequence. In order to define the dye-nucleotide interaction explicitly, we tested oligonucleotides with the fluorescent dye ~~Cy3(tm)~~ CY™3 covalently attached to the 5' end during synthesis. Sensors made from ~~Cy3(tm)~~ CY™3-labeled sequences can show distinctly different analyte response profiles. The LAPP1 sensor (Fig. 4A) showed good sensitivity to propionic acid and triethylamine (detection limits at dilutions of about 10-3), and less sensitivity to methanol, DNT and DMMP (detection limits at dilutions of about 2 x 10-2). In contrast, the LAPP2 sensor (Fig. 4B) showed good sensitivity to triethylamine (detection limit at dilutions of about 10-3), less sensitivity to DMMP (detection limit at dilutions of about 2

x 10-2), and no response to propionic acid, methanol, or DNT, even at high concentration (10-1 dilution).

[0200] Oligomers LAPP1, LAPP2, LAPPAS, and LAJ001 were synthesized and labeled at the 5' end with the fluorescent dye ~~Cy3(tm)~~ CY™3 during synthesis (using ~~Cy3(tm)~~ CY™3 phosphoramidite from Glen Research). The oligomers were stored in Tris-NaCl (10 mM Tris, 50 mM NaCl, pH 8) at 225 ng/ul, then diluted to a concentration of 50 ng/ul in distilled water just before use. Sensors were constructed by applying 20ul of dilute oligomer solution to 10mm x 12mm pieces of acid-washed 16xx silkscreen. Sensors were allowed to dry for at least 30min at room temperature, then attached to supports for testing.

[0207] To determine a minimum effective sensor sequence length, LAPP1 and LAPP2 sequences labeled with ~~Cy3(tm)~~ CY™3 are used as described. Sections of the two sequences are swapped, beginning with a swap point at the mid-point of the two sequences. A change in the analyte profile of either original sequence indicates that an effective sensor sequence is longer than the swap point.

[0211] Determine labeling procedure. Because any post-amplification procedures for attaching dye to the sensor sequences must be repeated about 10,000 times, the dye to the primer sequence is preferably, but not necessarily, attached so that it will be incorporated during amplification. In order to place the dye molecule as close as possible to the sensor portion of the sequence, the primer is labeled at the 3' end by incorporating an amino-allyl modified dC or dT (Glen Research) during synthesis. N-hydroxysuccinimide functionalized ~~Cy3(tm)~~ CY™3 (Amersham Biosciences) attaches the dye to the amino-allyl linker. After the dye reaction, a gel filtration

purification step removes the unincorporated dye. The dye-labeled primer is then ready to use in the amplification step 4.

[0228] DNA-~~Cy3(tm)~~ CY™3 Sensor Library. A set of DNA oligomers with random internal sequence and fixed ends (see Fig. 11) have been prepared by the Tufts University DNA/Protein Core Facility. Random nucleotide incorporation was used to generate the random portion of the oligomer. This random set provides DNA templates for amplification and labeling to produce a DNA-~~Cy3(tm)~~ CY™3 library for screening as described below.